

S.N. 09/676,011Page 11

REMARKS

Claims 1-29 are pending in this application.

Claims 3-7, 12-16, 19-22 and 25-28 are objected to.

Claims 1-2, 8-11, 17-18, 23-24 and 29 are rejected.

The office action dated August 28, 2003 indicates that claims 1, 23 and 29 are rejected under 35 USC §102(b) as being anticipated by Bamberger et al. U.S. Patent No. 5,970,164; claims 10 and 17 are rejected under 35 USC §102(b) as being anticipated by Shin U.S. Patent No. 5,524,070; claims 2, 11, 18 and 24 are rejected under 35 USC §103 as being unpatentable over Bamberger et al. in view of Shin; and claims 8 and 9 are rejected under 35 USC §103 as being unpatentable over Bamberger et al. in view of Shin and Kuo U.S. Patent No. 5,982,926.

According to one aspect of the present invention, contrast mapping of a digital image is performed, while retaining image fidelity. Retaining image fidelity is not a concern of either Bamberger et al. or Shin. Bamberger et al. appears to be concerned simply with enhancing medical x-rays. Shin appears to be concerned simply with enhancing text for optical character recognition.

'102 rejection based on Bamberger et al.

Claim 1 should be allowable over Bamberger et al. because Bamberger et al. do not teach or suggest (a) a variable range of pixel values; or (b) "clipping those pixel intensity values outside of a variable range." Bamberger describes gray scale stretching at column 7, lines 39+. Figure 3a of Bamberger et al. illustrates a linear mapping. However, there is no mention of the mapping range being variable. Column 7, line 55 appears to suggest a fixed range for an entire image.

S.N. 09/676,011Page 12

The examiner contends that Bamberger et al. disclose a variable range at step 210 of figure 2. However, this contention is not correct. According to column 6, lines 60+ of Bamberger et al, maximum and minimum values are taken over the entire image. There is nothing variable about the range. Moreover, the maximum and minimum values are used to set brightness and exposure times, not map pixel values.

Moreover, Bamberger et al. do not teach or suggest a clipping operation. The examiner contends that clipping pixel values is analogous to Bamberger's throwing out pixel values outside of a range. This contention is not correct. Clipping does not involve "throwing out" pixel values. It involves constraining pixel values. An exemplary clipping operation is recited in claim 4: a contrast-stretched pixel value $g(l)$ is constrained between minimum and maximum values m and M . Moreover, throwing out pixel values would reduce image fidelity and thereby degrade image quality.

For these reasons, Bamberger et al. do not teach or suggest clipping those pixel intensity values outside of a variable range. Therefore, claim 1 and its dependent claims 2-9 should be allowable over Bamberger et al.

Claims 23 and 29 recite clipping intensity value of a pixel of interest if the intensity value lies outside of a contrast range. These claims should also be allowable over Bamberger et al. since Bamberger et al. do not teach or suggest a clipping operation.

'102 rejection based on Shin.

The '102 rejections of claims 10 and 17 have been rendered moot by the amendments above. Amended claim 10 recites "determining a dynamic range of a pixel neighborhood, where the dynamic range of a pixel neighborhood is based on a difference of minimum and maximum pixel values in the pixel neighborhood." Shin does not teach or suggest a dynamic range. Instead, Shin

S.N. 09/676,011Page 13

discloses a standard deviation, which simply describes the second central moment of a neighborhood. Therefore, claim 10 and its dependent claims 11-15 should be allowed over Shin.

Amended claim 17 recites determining dynamic ranges of pixel neighborhoods for the pixels of interest, and performing contrast stretching on each pixel of interest within the dynamic range of the corresponding pixel neighborhood. Shin does not teach or suggest mapping within a dynamic range. Rather, Shin uses a standard deviation of local intensity values to determine whether stretching should be performed (see Figure 4, and col. 2, lines 37-63), but does not suggest limiting the stretching within a dynamic range.

'103 rejection based on Bamberger et al. and Shin

Claims 2, 8, 9, 11, 18 and 24 all recite clipping operations. As discussed above, Bamberger et al. do not teach or suggest a clipping operation. Neither do Shin or Kuo. Therefore, the '103 rejections of Claims 2, 8, 9, 11, 18 and 24 should be withdrawn.

Added claims

Claims 29-34 have been added to the application. These claims are believed to be allowable, since their base claim (claim 29) is believed to be allowable.

Conclusion

The application should now be in condition for allowance. The examiner is invited to contact the undersigned to discuss any remaining issues.